REMARKS

Section 102 Rejections

The Office Action rejects claims 1, 2 and 11 under 35 U.S.C. 102(b) as anticipated by Wu. Applicants traverse this rejection for the following reasons. Wu's invention does not describe the method of the present application as now claimed, where a buffer layer is deposited prior to the deposition of metal forming metal gate electrodes, and the buffer layer is selected to be consumed by reaction with the metal in an annealing process, as described in amended claim 1. In regard to claim 11, Wu does not describe a buffer layer that, when subjected to annealing, reacts with a metal to provide a desired work function.

The Office Action refers to Fig. 1, reference 8, of Wu as a buffer layer. The layer 8 of Fig. 1 referred to by the Office Action is not the buffer layer as described by claims 1, 2 and 11 of the present application, which according to claims 1 and 11 reacts with metal to form a gate electrode. In contrast, Wu's layer 8 of Fig. 1 is completely removed, as described by Wu at col. 4, lines 49 – 50. The Office Action also refers to Fig. 6, reference 16, of Wu as a metal. The polysilicon layer 16 of Wu is not a metal as described in claims 1 and 11. Wu therefore does not teach or suggest the buffer layer of claims 1 and 11, and also does not teach or suggest the buffer layer of claims 1 and 11 being consumed by a metal layer.

In further description of the difference between Wu's invention and that of amended claims 1 and 11 of the present application, the invention described by Wu focuses on nitridation of gate oxide using LPD (liquid phase deposition). The formed nitride is silicon oxynitride (SiON), which is different from the aluminum nitride buffer layer of the present application as now claimed, which upon annealing reacts with a metal and becomes a gate electrode. The nitride used in Wu's invention is used as a gate dielectric, and is not a gate electrode. Thus, the buffer layer of claims 1 and 11 (which becomes a gate electrode upon

annealing) serves a very different function than the gate dielectric of Wu. Wu's invention does not include the metal alloy gate of claims 1 and 11 of the present application, and Wu does not describe how to form a specific metal alloy gate with a desired work function for a dual metal gate integration, as in amended claims 1 and 11, which upon annealing reacts with a metal and becomes a gate electrode.

With regard to claim 2, the Office Action refers to Fig. 1, reference 8, of Wu as a buffer layer. As explained above, the layer 8 of Wu does not serve the function of the buffer layer of claims 1, 2 and 11. Wu's layer 8 is completely removed (see Wu at col, 4, lines 49 – 50), and therefore can not be the buffer layer of claims 1, 2 and 11, which layer reacts with the metal, being consumed (not removed) by an annealing process. Applicant therefore believes claim 2 is novel and allowable.

In specific response to the Office Action comments regarding claim 11, the Office Action refers to Wu's Fig. 1, reference 8, as a buffer layer. As explained above, this layer 8 is removed (col. 4, lines 49 – 50). The Office Action refers to Wu's Fig. 6, reference 16, as a metal, but reference 16 is polysilicon, which is not a metal as described in claims 1, 2 or 11 according to the present application. The Office Action refers to Wu, at col. 2, lines 37 – 54, as describing the annealing process of claims 1 and 11. Wu's anneal (col. 2, lines 51 – 54) is used to "condense LPD-oxide," which is not the annealing process described in claims 1 and 11 of the present application, which causes the buffer layer to react and be consumed with a metal layer.

Section 103 Rejections

The Office Action rejects claims 4 – 7 , 9, 10, and 13 under 35 U.S.C. 103(a) as unpatentable over Wu in view of Lim. Applicants traverse this rejection for the following reasons. Claims 4 – 7, 9, 10, and 13 depend on claims 1 or 11, which as explained above are

believed to be allowable. Applicants therefore believe claims 4 - 7, 9, 10, and 13 are allowable as they add further limitation to allowable claims. In addition, Applicants respond to the Office Action in more detail as follows. The Office Action points to Lim at col. 2, lines 46 – 60, where Lim describes the use of aluminum nitride as a trench liner. Applicants point out that a trench is a structure used to isolate adjacent independent devices, and is a very different use and unrelated to the use of aluminum nitride in the present application as a buffer layer under the deposition of a metal gate electrode, where the metal layers are selected to react to consume the buffer layer. Therefore, Lim's use of aluminum nitride can not be combined with Wu to teach or suggest the claims of the present application.

The Office Action rejects claims 8, 14 and 15 under 35 U.S.C. 103(a) as unpatentable over Wu and Lim in view of Huotari. Applicants traverse this rejection for the following reasons. Wu does not provide a buffer layer below a metal layer that combines/reacts with a metal layer to consume the buffer layer as in claim 1, upon which 8, 14 and 15 depend. Lim deals with the unrelated subject matter of a trench for isolation of devices, and Lim's use of aluminum nitride in a trench can therefore not be combined with Wu to teach or suggest the aluminum nitride buffer of claim 1. In addition, Huotari does not disclose a buffer layer that reacts and is consumed with a metal to form a gate electrode, and the discussion of gate electrodes therein reveals nothing that can be combined with Wu and Lim to suggest the present claims 8, 14 or 15. Applicants therefore believe these claims are allowable.

Regarding the Office Action rejection of claims 16, 17 and 18, Huotari does not describe a contact area between a metal gate and an adjacent metal gate dielectric comprised of an alloy formed from AlN_x and a metal whose electronegativity is less than 1.4. Huotari therefore does not teach or suggest the invention of claims 16, 17 or 18. In view of the above discussion, Applicants believe these claims are allowable.

CONCLUSION

Applicant has explained the differences between the claims and the cited references, and believes the claims are now in condition for allowance.

If any further questions should arise prior to a Notice of Allowance, the Examiner is invited to contact the attorney at the number set forth below.

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Respectfully submitted

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